

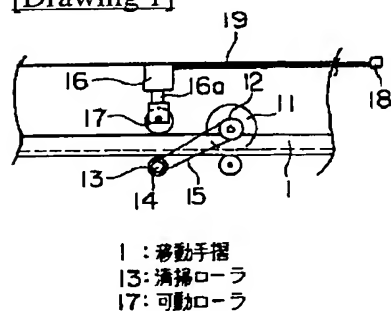
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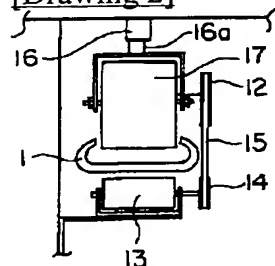
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DRAWINGS

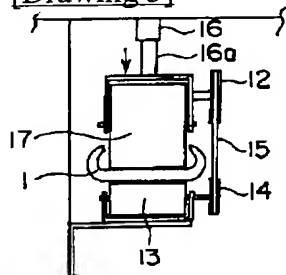
[Drawing 1]



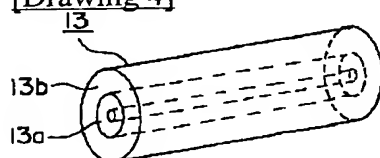
[Drawing 2]



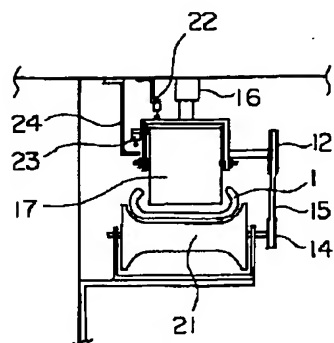
[Drawing 3]



[Drawing 4]

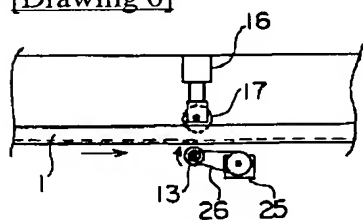


[Drawing 5]



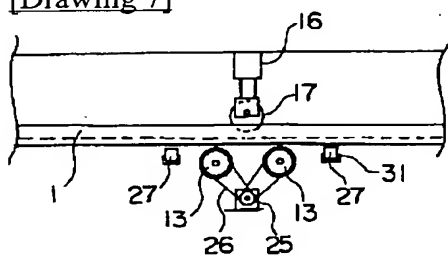
23 : 清掃位置検出スイッチ

[Drawing 6]



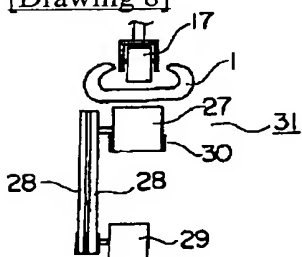
25 : モータ

[Drawing 7]

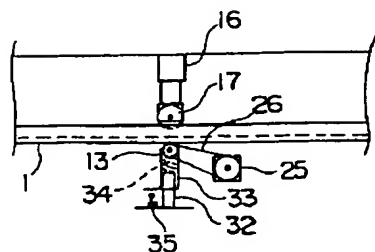


31 : 保護網張布器

[Drawing 8]

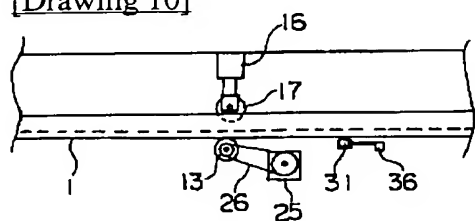


[Drawing 9]

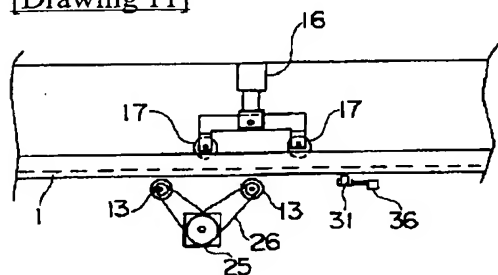


34 : ばね

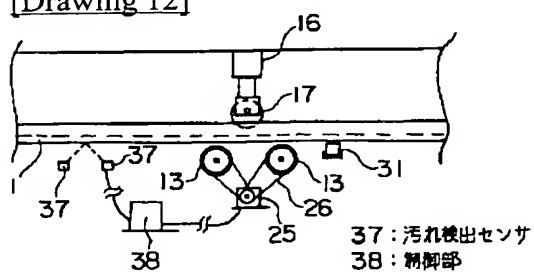
[Drawing 10]



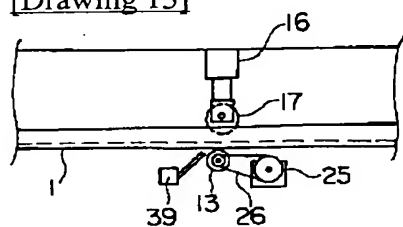
[Drawing 11]



[Drawing 12]

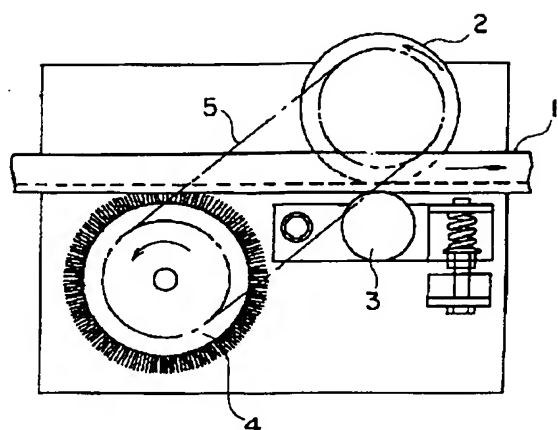
37 : 汚れ検出センサ
38 : 補助部

[Drawing 13]

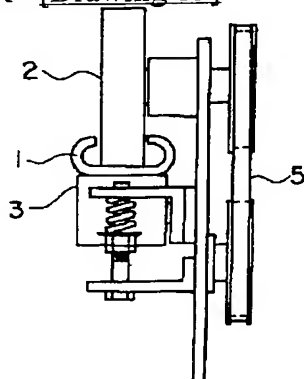


39 : クリーナ

[Drawing 14]



 [Drawing 15]



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the handrail cleaning equipment of the PAX conveyor for cleaning the migration handrail of an escalator or a moving walk.

[0002]

[Description of the Prior Art] The block diagram and drawing 15 which show the conventional handrail cleaning equipment with which drawing 14 was shown in JP,61-183386,U are the right side view of drawing 14 . In drawing, the brush roller which the migration handrail which 1 becomes from rubber etc., the friction roller which touch the rear face of the migration handrail 1 as rotated in 2 by migration of the migration handrail 1, the press roller with which 3 has always forced a migration handrail 1 on the friction roller 2, and 4 are arranged at the front-face side of a migration handrail 1, and cleans in the front face of a migration handrail 1 by rotation, and 5 are the belt transmit rotation of a friction roller 2 to a brush roller 4.

[0003] Next, actuation is explained. If the migration handrail 1 moves to the method of the right of drawing during operation of an escalator, the friction roller 2 in contact with this will rotate to the counterclockwise rotation of drawing, and the rotation will be transmitted to the brush roller 4 through a belt 5. Thereby, the brush roller 4 rotates to the counterclockwise rotation of drawing, and the front face of the migration handrail 1 is cleaned.

[0004]

[Problem(s) to be Solved by the Invention] the conventional handrail cleaning equipment constituted as mentioned above -- setting -- under operation of an escalator -- a brush low -- since 4 is always rotating, there is a possibility that a blemish may be attached to the front face of the migration handrail 1 with time. Moreover, since the brush roller 4 rotates the migration direction of the migration handrail 1, and reversely, the rolling resistance of the migration handrail 1 is made to increase. Furthermore, since the migration handrail 1 is continuing being pressed with the press roller 3 also during a halt of an escalator, there were troubles, like the remains of an indentation of the press roller 3 remain in the front face of the migration handrail 1.

[0005] This invention aims at obtaining the handrail cleaning equipment of the PAX conveyor which can be made considering solving the above troubles as a technical problem, and can prevent that a blemish is attached to a migration handrail by too much cleaning, and can prevent increase of rolling resistance, and can prevent that the remains of an indentation remain in a migration handrail further.

[0006]

[Means for Solving the Problem] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 1 is formed in the pivotable cleaning roller [which is countered and formed in the front face of a migration handrail], and rear-face side of a migration handrail possible [reciprocation] and pivotable, and it has the movable roller push the front face of a migration handrail to a cleaning roller by pressing the rear face of a migration handrail and moving a migration handrail to a cleaning roller side.

[0007] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 2 is equipped with the cleaning location pilot switch which detects the location of the movable roller at the time of cleaning.

[0008] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 3 is equipped with the motor made to rotate a cleaning roller independently with migration of a migration handrail, and it is made for a cleaning roller to rotate it in the migration direction and this direction of a migration handrail more quickly than a migration handrail.

[0009] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 4 is countered and formed in the front face of a migration handrail, and is equipped with the protective agent applicator which a migration handrail is forced at the time of cleaning, and applies a protective agent to the front face of a migration handrail.

[0010] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 5 is supported through the spring possible [reciprocation] in the direction where a cleaning roller attaches and detaches to a migration handrail.

[0011] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 6 is equipped with the dirt detection sensor which detects the dirt of a migration handrail quantitatively, and the control section which controls actuation of a movable roller and a cleaning roller according to the information from this dirt detection sensor.

[0012] The handrail cleaning equipment of the PAX conveyor concerning invention of claim 7 is formed near the cleaning roller, and is equipped with the cleaner which carries out suction removal of the dispersing dirt.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained about drawing.

The block diagram and drawing 2 which show handrail cleaning equipment according [gestalt 1. drawing 1 of operation] to the gestalt 1 of implementation of this invention are the left side view of drawing 1 .

[0014] The established driving roller to which 11 contacts the rear face of the migration handrail 1, and the migration handrail 1 is moved in drawing, They are the pulley with which 12 is rotated to a driving roller 11 and one, and the cleaning roller with which 13 has set and countered spacing predetermined to the front face of the migration handrail 1. This cleaning roller 13 As shown in drawing 4 , it has cleaning band of product made from felt for example, by which it is prepared in the periphery section of heart 13a [of the shape of a cylinder which consists of a metal], and this heart 13a 13b. The pulley which 14 rotates to the cleaning roller 13 and one, and 15 are belts which are prepared between a pulley 12 and 14 and transmit rotation.

[0015] The small hydraulic jack currently fixed as the rear face of the migration handrail 1 countered in 16, and 17 are movable rollers which are formed in the point of cylinder 16a of a hydraulic jack 16 and which can be rotated, and this movable roller 17 reciprocates in the direction which attaches and detaches to the migration handrail 1 with a hydraulic jack 16. 18 is a pump connected to the hydraulic jack 16 through piping 19.

[0016] In the equipment constituted as mentioned above, since the cleaning roller 13 and the movable roller 17 are opening from the migration handrail 1 during the usual operation, even if the cleaning roller 13 is rotating, the migration handrail 1 is not cleaned. From this condition, an operator's actuation of a cleaning command switch (not shown) carries out specified quantity migration of the movable roller 17 with a hydraulic jack 16 to the migration handrail 1 side. Thereby, the migration handrail 1 is moved, and as shown in drawing 3 , the front face of the migration handrail 1 is forced on the cleaning roller 13. Since the cleaning roller 13 is rotating in the direction contrary to the migration direction of the migration handrail 1 at this time, the front face of the migration handrail 1 is cleaned by this cleaning roller 13. The movable roller 17 will open [return, the cleaning roller 13, and the movable roller 17] from the migration handrail 1 in the original location by operating a cleaning command switch again after an activity.

[0017] Since according to such equipment the cleaning roller 13 is opening from the migration handrail 1 unless an operator performs switch actuation, the migration handrail 1 does not get damaged by superfluous cleaning, and increase of rolling resistance is also suppressed to the minimum. Furthermore, since the cleaning roller 13 and the movable roller 17 are usually opening from the migration handrail 1, it is also prevented that the remains of an indentation remain in the migration handrail 1.

[0018] In addition, although the above-mentioned example showed the cleaning roller 13 made from the felt, if it is made to sometimes open from the migration handrail 1 and can usually sometimes set, it is good also considering the roller of other ingredients, such as a brush roller, as a cleaning roller, for example. Moreover, the driving source of the movable roller 17 may not be limited to a hydraulic jack 16, and may be an electric motor etc.

[0019] Gestalt 2. of operation, next drawing 5 are the side elevations showing the handrail cleaning equipment by the gestalt 2 of implementation of this invention. In drawing, the cleaning roller with which 21 is formed in the configuration where the peripheral face met the front face of the migration handrail 1, the return location pilot switch to which 22 detects the return location of the movable roller 17, the cleaning location pilot switch which 23 reciprocates with the movable roller 17 and detects the location of the movable roller 17 at the time of cleaning, and 24 are actuation metallic ornaments which operate the cleaning location pilot switch 23. Other configurations are the same as that of the gestalt 1 of the above-mentioned implementation.

[0020] With such equipment, since the cleaning roller 21 of a periphery configuration in alignment with the configuration of the migration handrail 1 was used, cleaning area can be extended to the bending section of the migration handrail 1, and cleaning effectiveness can be raised. Moreover, since the operating range of the movable roller 17 which reciprocates is regulated by each switches 22 and 23, while dependability improves, pressure can be adjusted appropriately.

[0021] Gestalt 3. of operation, next drawing 6 are the block diagrams showing the handrail cleaning equipment by the gestalt 3 of implementation of this invention. In drawing, a motor for 25 to rotate the cleaning roller 13 and 26 are belts which transmit the driving force of a motor to the cleaning roller 13.

[0022] Although the cleaning roller 13 was rotated the migration direction of the migration handrail 1, and reversely with the gestalt 1 of the above-mentioned implementation, since the motor 25 which is the independent driving source was formed, the cleaning roller 13 can be rotated in the migration direction and this direction of the migration handrail 1 in this example more quickly than the migration handrail 1. Thereby, increase of the rolling resistance of the migration handrail 1 can be prevented more certainly.

[0023] Gestalt 4. of operation, next drawing 7 are the block diagrams showing the handrail cleaning equipment by the gestalt 4 of implementation of this invention. In this example, two cleaning rollers 13 rotate by one motor 25. Moreover, two spreading rollers 27 which apply a surface protective agent to the front face of the migration handrail 1 counter the front face of the migration handrail 1, and are arranged. The spreading roller 27 is connected to the motor 29 through the belt 28, as shown in drawing 8. Moreover, it is immersed by the lower part of the spreading roller 27 into the protective agent in the protective agent receptacle 30. The protective agent applicator 31 is constituted by the spreading roller 27, a belt 28, an above-mentioned motor 29, and the above-mentioned protective agent receptacle 30.

[0024] Since two cleaning rollers 13 by which a coincidence drive is carried out were formed according to such equipment, cleaning effectiveness can be raised. Moreover, since a protective agent can be applied to the front face of the migration handrail 1 with the protective agent applicator 31 at the time of cleaning, it is [the front face of the migration handrail 1] dirt-hard, and it can be carried out.

[0025] Gestalt 5. of operation, next drawing 9 are the block diagrams showing the handrail cleaning equipment by the gestalt 5 of implementation of this invention. In drawing, the spring with which the movable supporting material of the shape of a cylinder which can move up and down, and 34 are prepared between the fixed supporting material 32 and the movable supporting material 33 to the fixed supporting material 32, and the fixed supporting material which 32 is fixed to the fixed part of an escalator and supports the cleaning roller 13, and 33 energize the movable supporting material 33 to an upper part 1, i.e., migration handrail, side, and 35 are pilot switches which detect the motion limit community to the lower part of the cleaning roller 13.

[0026] With such equipment, since vertical movement of the cleaning roller 13 is attained in a certain amount of range, the irregularity of the front face of the migration handrail 1 can be absorbed, the cleaning roller 13 can always be stuck on the front face of the migration handrail 1, and cleaning unevenness can be abolished. Moreover, if the cleaning roller 13 falls too much, since the tension of a belt 26 will change too much, a pilot switch 35 detects the lower limit community of the cleaning roller 13, and if a pilot switch 35 operates, the pressure of the movable roller 17 will be canceled.

[0027] Gestalt 6. of operation, next drawing 10 are the block diagrams showing the handrail cleaning equipment by the gestalt 6 of implementation of this invention. In this example, the same protective agent applicator 31 as drawing 8 is formed, and the pump 36 is connected to this protective agent applicator 31. The protective agent is stored in the pump 36 and a protective agent is supplied for every fixed time amount with a timer etc. during operation of the protective agent applicator 31 at the protective agent applicator 31. Thereby, it is stabilized to the migration handrail 1 for a long time, and a protective agent can be applied to it.

[0028] Gestalt 7. drawing 11 of operation is the block diagram showing the handrail cleaning equipment by the gestalt 7 of implementation of this invention. In this example, in order to form the protective agent applicator 31 in addition to two cleaning rollers 13 and to force the migration handrail 1 on these with sufficient balance, predetermined spacing is set mutually and two movable rollers 17 are formed. Thus, according to the number and the location of the cleaning roller 13 or the protective agent applicator 31, the migration handrail 1 can be forced on the cleaning roller 13 or the protective agent applicator 31 with sufficient balance by changing the number and the location of the movable roller 17.

[0029] Gestalt 8. of operation, next drawing 12 are the block diagrams showing the handrail cleaning equipment by the gestalt 8 of implementation of this invention. In drawing, 37 is countered and prepared in the front face of the migration handrail 1, it is the dirt sensor (photosensor) of the pair which detects the dirt of the front face of the migration handrail 1 quantitatively, and this dirt sensor 37 will output a dirt detecting signal, if the dirt beyond the set point is detected. 38 is a control section which receives a dirt detecting signal and outputs a cleaning command signal.

[0030] Since according to such equipment the dirt of the migration handrail 1 can be supervised and it can clean automatically at the time of the need, the cleaning condition of the migration handrail 1 can be kept easily constant. Moreover, cleaning equipment is started by the operator, and if dirt becomes below the set point, control stopped automatically can also be performed easily.

[0031] Gestalt 9. drawing 13 of operation is the block diagram showing the handrail cleaning equipment by the gestalt 9 of implementation of this invention. In this example, the cleaner 39 is formed near the cleaning roller 13. Suction removal of the dirt of the shape of powder which disperses at the time of cleaning can be carried out with a cleaner 39 by this, and it can prevent that dirt carries out the reattachment to a surrounding device.

[0032]

[Effect of the Invention] As explained above, the handrail cleaning equipment of the PAX conveyor of invention of claim 1 Since counter the front face of a migration handrail, a cleaning roller is formed, a migration handrail is pressed from a rear face with a movable roller at the time of cleaning and it was made to contact the front face of a migration handrail on a cleaning roller It is prevented that a migration handrail gets damaged by superfluous cleaning, and it can suppress increase of rolling resistance to the minimum, and the effectiveness of being able to prevent that the remains of an indentation remain in a migration handrail further is done so.

[0033] Since the handrail cleaning equipment of the PAX conveyor of invention of claim 2 prepared the cleaning location pilot switch which detects the location of the movable roller at the time of cleaning, it can adjust the pressure over a migration handrail appropriately.

[0034] Since the motor made to rotate a cleaning roller independently with migration of a migration handrail is formed and it was made for a cleaning roller to rotate in the migration direction and this direction of a migration handrail more quickly than a migration handrail, the handrail cleaning equipment of the PAX conveyor of invention of claim 3 can prevent increase of the rolling resistance of a migration handrail more certainly.

[0035] Since the handrail cleaning equipment of the PAX conveyor of invention of claim 4 prepared the protective agent applicator, it can also perform protection of a migration handrail to cleaning and coincidence.

[0036] Since the cleaning roller is supported through the spring possible [reciprocation] in the direction which attaches and detaches to a migration handrail, to the irregularity of the front face of a migration handrail, the handrail cleaning equipment of the PAX conveyor of invention of claim 5 is stabilized, can push a cleaning roller, and can prevent generating of cleaning unevenness.

[0037] Since the handrail cleaning equipment of the PAX conveyor of invention of claim 6 detects the dirt of a migration handrail quantitatively by the dirt sensor and controlled actuation of a movable roller and a cleaning roller according to the information, it can make cleaning actuation perform easily efficiently.

[0038] Since the handrail cleaning equipment of the PAX conveyor of invention of claim 7 formed the cleaner which carries out suction removal of the dispersing dirt, it can prevent that dirt adheres to a surrounding device.

[Translation done.]